175

MR. MULLADY: I realize that we haven't gotten into 1 this yet. I'm asking her if that's an assumption that she had to make to use an average.

What I had to do to use an average is -- was one that I  $5\parallel$  had 11,250 days of exposure. If two days happened to be  $6\parallel$  implemental in somebody's 1,250 in this category it would be 7 immaterial and the whole point was to discuss the large 8 influence of environmental factors on measurements so that over 9| time those factors cancel out and we get a good measurement for 10 that particular nature of exposure category.

So to single out two days would not have made a 12 difference to my analysis, if that's what you are asking me. 13 One individual.

- That's not exactly what I'm asking. Let me see if I can 15 go at it this way. You, on direct, I believe you discussed the 16 concept of environmental variability, correct?
- 17 | A That's right.

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- 18 Q And you used wind as an example.
- That's right. 19 | A
- There is also something known as inter-worker variability, 20 Q 21 correct? Are you familiar with that term?
- 22 Α As what?
- Inter-worker variability. 23 | Q
- I said that there could be some variability amongst 24 A 25 workers, and that the environmental factor vastly made the

176

1 difference.

- Q Well let's test that. For example, some people are right handed and some people are left handed and some people are tall and some people are short. Correct?
- 5 A Correct.
- 6 Q Those are qualities in a person that are going to persist 7 over time. Correct?
- 8 A I think that Dr. Lees, as I understand, addressed that 9 issue.
- Q Yes, he did discuss that. And I think he said the differences between workers might effect exposure. Do you agree with that?
- A In a very minor way and over a long period of time the
  environmental factors vastly swamp the slight variations in the
  workers.
- 2 So if there was a circumstance, hypothetically where right handed workers were exposed to more asbestos, something about the right-handedness in how the job was performed causing them to be exposed more, that would no longer be random. That would persist over time, correct?
- A Yes, and I said that that would make very little
  difference to this entire category of exposures and that the
  environmental variation would be backed by the dominant factor.
  That would be -- pardon.
- 25 Q Unlike the person, I believe you said it's inconceivable

-- on direct, I think you said it's inconceivable that someone would be in the wrong place at the wrong time for 45 years. But it wouldn't be inconceivable for someone that had the characteristic like right-handedness to have an exposure that's 5 much different than other workers for an entire 45 year working career. Most people are right handed.

You would have to convince somebody else that this is going to make very much difference. We are talking about exposure to a job category. We are not talking about individuals. We are talking about a long period of time and 11∥ we're talking about a dominant kinds of parameters that cause 12∥ the variability in data. I don't think right-handedness and 13∥ left-handedness are going to put -- to make that mean differ.

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If you have some odd individual who happens to be 15 somewhere way out on a curb, it's not going to change this 16 | categorical definition at all. And I said in some of my final analysis that it would be a very low probability event given all of the considerations that went into the analysis that anyone in a B, C or D would experience anything on that far end of the curve.

All right, well, let's talk about what workers are doing in the real world. I notice on GG-2271 which we have on the ELMO here you've identified as environmental variables, variation by sampling location, job and time. Why was -- why is job an environmental variable? If I'm a sprayer, why would

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177

178

my being a sprayer be subject to the same sort of environmental variability as the blowing of the wind?

- A Well in this particular case I was thinking of variability around different kinds of positioning of people in these job categories that they can be different but they are going to move around to converge and they are totally random. There is not going to be any systematic way that would cause a bias in that information.
- 9 Q You believe it's going to be totally random on a day to
- 11 A Random over --

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- 12 Q -- a sprayer becomes a helper for example?
- 13 A -- wait, what was the last part of that?
- 14 Q Whether a sprayer becomes a helper. That's a random event 15 that could change from day to day?
- A Well I mean, again, I'm defining exposures for these job
  categories. Now if someone is an A for part of 45 years and
  they change and they become a different category they are going
  to have different exposures. But again this isn't an
  individual exposure.
- 21 Q I'm sorry. I don't think I made myself clear in my
  22 question. I apologize for that. I'm asking you to focus in on
  23 variability within a category, within a category, within B, D
  24 and E. We have a number of different jobs being performed by
  25 workers of different skill abilities in different -- sometimes

in different trades. Is that correct?

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That's correct. Certainly in the B, D and E for bystanders they can be different again, but there are different trades involved. Perhaps in the Bs.

In order for your assumption to be corrected over time the exposures of people within this category will converge to the mean, you have to -- these workers have to be independent. 8 has to be completely random from day to day which of these activities and which of these exposures they're getting, correct?

MR. BERNICK: Objection. That's an assumption.

That's an assumption that you have had to make to conclude 13 that it converges to the mean?

MR. BERNICK: Objection to the form of the question. 15 First of all the word independent. I don't believe there's been any dialogue on that, no definition of it, no use of it. And then the second part of the question is you have to assume that there is complete randomness. I don't know what that has to do with the first part of the question and therefore object to the form of the question.

THE COURT: You've got words in there that have introduced new elements that have not been part of the discussion. And you've got a compound question because you added the word correct, question mark, before you asked the next part several times. If you want to rephrase and break it

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179

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down into parts, fine.

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MR. MULLADY: Okay.

Let's -- let me ask you this doctor. In your expert reports you cited your general reference material, the things you've used and relied upon in reaching your opinions in this 6∥ case. Have you cited us in your reports to any studies or articles that would substantiate the proposition that over time 8∥ workers' asbestos exposures are going to converge to the average for the category or general type of work that they do? What I have cited is roughly 20 or 30 years of experience 10|| A 11 dealing with the variety of environmental data sets, in air, 12 with pesticides, in water, at waste sites, for different jobs 13 for different situations. We sometimes even build simulated 14 chambers just to have an environment where we can measure what 15∥ the experience for a particular job or person engaged in an activity might be. These are totally acceptable ways to make these judgments.

In this case we are defining the likely exposure to 19 these individuals in these categories given a body of 20 information. It's for the category and you keep asking me 21∥ about individuals. So I don't know what you are asking me to 22|| respond to otherwise. I guess I don't understand your 23 question.

Isn't it the case that certain workers doing certain tasks 25∥ that by virtue of inter-worker variability subject them to